a tumbler. On March 7th there was only one living mite and the eggs were still red in color, but they were not normal nor had they hatched. They were soft, and when broken contained a liquid instead of a young spider. Another collection of leaves made just after the freeze and examined on February 15th, gave the same results; the eggs did not hatch. On another tree there were many unhatched eggs. On February 17th these appeared to be very soft. On these same leaves there were 13 young mites that had evidently hatched since the freeze. No doubt the adults, young mites and eggs were largely killed when in exposed places.

In fairly well protected spots the adults and young were not killed. On February 29th there were 23 adult females, 8 males and 10 young mites living on a few camphor leaves. The eggs, however, did not appear to be normal. They had that same dull look as the others that never hatched.

The observations on this mite show that all stages are easily affected by the cold, and especially are the eggs damaged, which is contrary to expectations. The adults survive only in protected places. On June 1 there were practically none of this species present, while there are specimens of *Tetranychus sexmaculatus* and *Tetranychus citri.*

NOTES ON SOME INSECTS OF SOUTH FLORIDA IN 1917

By R. N. WILSON

(Paper given before the Florida Entomological Society.)

The above title is somewhat too inclusive, as the observations were made almost entirely in Palm Beach County, tho some were made in other counties.

Dictyophorus reticulatus—The Lubber Grasshopper. These large grasshoppers were very numerous on some of the drained saw-grass lands along the Palm Beach Canal in the Everglades, but because this land has not yet come under cultivation little damage resulted. Along the shores of Lake Okeechobee where severe injury has resulted from their attack during certain years, these grasshoppers were present in small numbers, but were not troublesome. The writer's previous experience with this species at Fellsmere and other points had proved that it could be controlled with the so-called "Kansas Mixture" (bran, paris green, syrup and citrus fruit) even when there was a large influx from surrounding lands. None of the melanic forms were found, as would be expected from the known distribution of the various forms.

Empoasci mali—The "Green Fly." This little jassid or leaf hopper, which is commonly called the "Green Fly," made its appearance very late in the spring, and caused injury only in small areas during the entire summer. This is quite an unusual occurrence since snap beans maturing in March are often severely attacked, and cowpeas may be entirely destroyed during the average summer. The reasons for the scarcity of this jassid during the year are not known, tho many farmers attribute it to the cold in early February. No satisfactory control measures are known, even on truck crops. The promising contraption for catching the leaf hoppers invented by Mr. Oller of Delray is not now in use, because, altho thousands of the insects were caught the numbers remaining in the fields were not perceptibly reduced. On account of its wide range of food plants swarms of this jassid may come in from adjoining lands.

Laphygma frugiperda—The Fall Army Worm. The habits of this insect seem to be slightly different in South Florida than in other parts of the United States, in that altho they are extremely numerous during spring, summer and fall, particularly in corn fields, they rarely assume the "army" habit. There are few of our insects that do more damage than the Fall Army Worm, and the limited acreage of corn on the lower East Coast is not increased because this insect is present. Corn planted in February or early March can mature and escape with only slight injury, but later plantings of corn, other than the Nassau corn and its close relatives which have some immunity, are usually riddled and sometimes even its ensilage value destroyed. Altho some farmers have tried to control the pest with arsenate of lead, few of them have been persistent, and little good has resulted. This species is more often found in the ears and damages them more in South Florida than the common corn ear worm, *Heliothis obsoleta.*

Diabrotica vittata—The Cucumber Beetle. Just how long this species has been in South Florida is uncertain, estimates varying from two to five years, but certainly in that time it has come to be one of our most important insects. These beetles were in the fields in considerable numbers during the freeze in early February, which apparently did not injure them. Altho their principal injury is to cucurbits, sunflowers and other plants are sometimes injured, and during the spring the writer saw them attack the tender foliage of citrus trees in a few localities. They occur on the cucurbits in such swarms that the usual poisons

and repellants do not seem effective, but excellent results were obtained this year by frequently covering the plants with cornmeal or flour, and sometimes arsenate of lead was mixed with these. The beetles apparently prefer to eat the meal or flour to eating the plants, and with careful and frequent dusting the plants can be saved.

Chalcodermus aeneus—The Cowpea Pod-Weevil, or Cowpea Curculio. It was with considerable surprise that the writer found heavy infestations of this beetle on the east shore of Lake Okeechobee, because this section has had almost no previous cultivation, and has been absolutely isolated from cultivated areas. This observation probably points to a native food plant on which the beetle has been thriving in that locality. No control measures were attempted in the Lake region and the peas in several fields were a total loss. Along the coast in Palm Beach County little damage by this species was seen or reported.

Phytoptus calacladophora—White Mold. Many farmers believe the moldy appearance caused by the infestation of this mite to be a disease, which is not surprising when we consider that the mite is usually difficult to see with the naked eye. During the year this species became very abundant on tomatoes, and the most interesting point observed was that on muck lands the farmers had little trouble bringing it under control with the sulphur sprays, while on the sandy lands it seemingly could not be stopped by almost continual spraying and caused very severe injury. Farmers report that this is the case to a certain extent every year.

Millipedes. On the shore of Lake Okeechobee where eggplants and peppers were set in the muck lands following the clearing of heavy weeds and brush in August and September they were attacked by millipedes and some injury done. The millipedes did most of their work at night, tho some few could be found on the plants in day time. Upon digging around the plants three to six millipedes could be found in many instances. The damage was most pronounced near the edge of the fields, and investigation showed that there were thousands of the millipedes under the piles of brush. Arsenate of lead was recommended as a control measure, and probably the "Kansas Mixture" broadcasted would be effective.

Negro Bugs. During August and September there was considerable complaint of injury in the Lake Okeechobee region from these small black bugs, which the farmers called beetles. It

is certain that large numbers of the bugs were present in the seed beds and in some fields, but the writer is inclined to doubt that they did much damage. Prof. Watson recommended crude carbolic acid used at the rate of a tablespoonful to two gallons of water or a dust made by adding a half pint of the acid to a bushel of lime or plaster, but I do not know what results were obtained.

Tabanids. Among our very worst pests of livestock are the large Tabanids which appear in great numbers for from four to eight weeks in the spring. I have seen even mules covered with bloody splotches caused by the bites of these insects in one day. Work animals are usually protected by repellant mixtures, mechanical means or by screening their quarters, but the unfortunate range animals suffer severely and lose weight considerably during this period. This is a problem to which little attention has been given, and which, in justice to our growing livestock industry, deserves to be attacked with vigor.

BOOK AND BULLETIN NOTICES

The October number of the Quarterly Bulletin of the State Plant Board contains two valuable articles on scale insects. The first on "Some Florida Scale Insects," by C. E. Wilson, lists 83 species, most of which are illustrated by original photographs. This is a very credible list and should be a great help to those working with these insects.

We note under Cottony Cushion Scale, p. 18, many plants listed as not having been found infested in Florida that should have been recorded among the Florida hosts, as they were found infested at Key West (See An. Rep. Fla. Ag. Exp. Sta. 1915 p. lxxiv).

The second article by Dr. E. W. Berger on the control of scale insects is the latest word on the subject.

Press Bul. 285, Fla. Ag. Exp. Sta., is on the San Jose Scale and No. 286 treats of the Boll Weevil in Sea Island cotton.

Farmers' Bul. 875, U. S. D. A., treats of (*Ligyrus*) *Euetheola rugiceps* which the authors, Philip and Fox, call the rough-headed corn stalk-beetle. This beetle is common in Florida but no serious injury to corn seems to have been noted.

Farmers' Bul. 843 on pecan insects is of peculiar interest to us, as it is the result of work done mostly in Florida by J. B. Gill, who is stationed at Monticello.

Bul. 609, U. S. D. A. (Professional Paper), is on *Pilocrocis*